Aponogetonaceae, Juncaginaceae, Alismaceae, Butomaceae, and Hydrocharidaceae. From an investigation of adult structure and manner of development, he has concluded that the axillary scales found at the bases of the leaves in the plants of these genera are homologous with the more specialized and solitary stipules of Selaginella and Isoetes. It will be recalled that GIBSON regards the ligule as a sort of specialized ramentum, protecting and keeping moist the young leaves and growing apex of Selaginella and Isoetes.—FLORENCE LYON.

Reserve food of trees.—NIKLEWSKI[24] confirms by macrochemical methods the observation of RUSSOW and of FISCHER, that in winter the fat-content of trees first increases and then diminishes. The process cannot be reversed by temperature changes. While a rise of temperature accelerates the formation of fat, no change affects its solution. The transformation of fat and of starch are not related. Low temperatures promote the formation of sugar from starch. Complex phenomena result from a rise of temperature. So great is the loss of reserves by the increased respiration, that it seems probable that bodies other than starch or fat share in the metabolism and give rise to carbohydrates.—C. R. B.

Conjugation of yeasts.—GUILLIERMOND[25] has extended his studies on the conjugation of yeasts to several additional forms of the Schizosaccharomyces and Zygosaccharomyces. The union of the cells is followed by the fusion of the two nuclei, after which the fusion nucleus divides and the two cells separate or spores are formed in the fusion cell. In some forms conjugation takes place with the germination of the spores. GUILLIERMOND regards this cell and nuclear fusion as a sexual act, but of course chiefly on physiological grounds. Since we do not know the history of the yeasts, it is a matter of speculation whether or not these conjugating cells are phylogenetically gametes.—B. M. DAVIS.

Amphispores in Uredineae.—ARTHUR has given an account of all species of rusts which have amphispores,[26] *i. e.*, as defined by CARLETON, one-celled spores which resemble the teleutospores of Uromyces in appearance, but have two or more germ-pores, and in germination behave like uredospores, their function seeming to be to tide the fungus over unfavorable conditions. This account includes one species of Uromyces and eight of Puccinia, one of which, *P. Garrettii*, is new. All the forms are American, for thus far no cases of the occurrence of amphispores have been reported from other parts of the world.—H. HASSELBRING.

Photosynthesis extra vitam.—BERNARD has again examined carefully the

[24] NIKLEWSKI, B., Untersuchungen über die Umwandlung einiger stickstoffreier Reservestoffe während der Winterperiode der Bäume. Beihefte Bot. Centralbl. **19**[1]: 68–117. 1905.

[25] GUILLIERMOND, M. A., Recherches sur la germination des spores et la conjugaison chez les lévures. Rev. Gén. Bot. **17**:337–376. *pls. 6–9. figs. 11.* 1905.

[26] ARTHUR, J. C., Amphispores of the grass and sedge rusts. Bull. Torr. Bot. Club **32**:35–42. *figs. 9.* 1905.

question of photosynthesis *in vitro*, and again with negative results.[27] He repeated MACCHIATI'S experiments (following his directions *in litt.*), and tried also those of MOLISCH, which lent faint support to MACCHIATI'S conclusions. The gas disengaged seems due only to bacterial infection and when obtained at all does not conform in amount to that demanded by theory. This accumulation of negative results makes exceedingly doubtful the claims of FRIEDEL and MACCHIATI.—C. R. B.

Measuring transpiration.— CANNON describes[28] a method of studying the rate of transpiration upon plants in place, which he calls the polymeter method, because LAMBRECHT'S portable polymeter, a combined hygrometer and thermometer is used to ascertain the increase in humidity of the atmosphere around the experimental plant when enclosed in a bell jar. Certain defects in the method are noted, but the most important one, that it itself produces a variable decrease in transpiration, is not mentioned.— C. R. B.

Diastase.— KLEEMANN, finding the known methods of determining the course of diastase formation not sufficiently accurate, proposes a new, and, as he claims, more satisfactory one.[29] Using it he has determined that the amount of diastase formed depends, on the one hand, upon the water content of the barley, and on the other, upon how the water is supplied and taken up, and that the loss by respiration is greater the greater the water content.— C. R. B.

The sporophyte of mosses.—TRUE finds[30] that the nodding of the capsusel of Mnium, and probably of Funaria also, is due to geotropic stimulation, while the direction of illumination determines the plane of the curve in the seta, the apex of the capsule sometimes curving toward and sometimes away from the incident light. The calyptra affords important protection to the growing sporophyte from mechanical injury and desiccation.—C. R. B.

Chloroform a stimulant.— So Miss Latham[31] finds it in small quantities to Sterigmatocystis, especially at the time of germination, while larger quantities are inimical or fatal. Less acid formation and less sugar consumption under the stimulus indicate greater metabolic economy.—C. R. B.

Chromosome reduction.—A useful collective review of the recent literature on this subject is presented by KÖRNICKE in Bot. Zeit. **63**[2]: 289–307. 1905.—C. R. B.

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[27] BERNARD, C., Sur l'assimilation chlorophyllienne. Beihefte Bot. Centralbl. **19**[1]: 59–67. 1905.

[28] CANNON, W. A., A new method of measuring the transpiration of plants in place. Bull. Torr. Bot. Club **32**: 515–529. 1905.

[29] KLEEMANN, A., Untersuchungen über Malzdiastase. Landw. Versuchsstat. **63**: 93–134. 1905.

[30] TRUE, R. H., Notes on the physiology of the sporophyte of Funaria and Mnium. Beihefte Bot. Centralbl. **19**[1]: 34–44. 1905.

[31] LATHAM, M. E., Stimulation of Sterigmatocystis by chloroform. Bull. Torr. Bot. Club **32**: 337–357. 1905.